part of applicant's *earlier* work, and as such are found in those incorporated documents. (Such incorporation by reference is expressly authorized by MPEP §608.01(p).)

Regarding the first point (the encoding spanning the article rather than being localized), it will be noted that the first patent incorporated-by-reference in application 60/082,228[1] is Rhoads' patent 5,710,834. This patent teaches, in one embodiment,[2] a photo watermarking method in which each bit position in the watermark payload (termed the "N-bit identification word") is associated with a frame of noise-like data that is added at low intensity – or not – to the host photograph to effect encoding of a "1" (or "0") bit for that respective bit position.[3]

Each frame of noise-like data has the same dimensions as the photo being encoded. Thus, if the photo is a 512 x 512 pixel image, the frame of noise data also has dimensions of 512 x 512.

As a consequence, the encoding effected by this technique spans the *entire* content being watermarked, rather than being localized.

A second embodiment[4] detailed in the same '834 patent has this same feature, that the encoding spans the entire content, rather than being localized. In this second embodiment, samples of the input data are dealt with serially, and each is summed with a corresponding sample of a low amplitude noise signal. This summing continues for *each*

---

1 See 60/082,228 (filed with March 26, 2003 Amendment), page 1, lines 2 – 6.

2 Patent 5,710,834, "BATCH ENCODING" embodiment, col. 6, line 24 – col. 17, line 40; Fig. 2.

3 Patent 5,710,834, *e.g.*, col. 6, lines 27-49, which states:

> *The N-bit identification word refers to a unique identification binary value, typically having N range anywhere from 8 to 128, which is the identification code ultimately placed onto the original signal via the disclosed transformation process. In the illustrated embodiment, each N-bit identification word begins with the sequence of values "0101," which is used to determine an optimization of the signal-to-noise ratio in the identification procedure of a suspect signal (see definition below).*
>
> *The m'th bit value of the N-bit identification word is either a zero or one corresponding to the value of the m'th place, reading left to right, of the N-bit word. E.g., the first (m=1) bit value of the N=8 identification word 01110100 is the value '0;' the second bit value of this identification word is '1', etc.*
>
> *The m'th individual embedded code signal refers to a signal which has dimensions and extent precisely equal to the original signal (e.g. both are a 512 by 512 digital image), and which is (in the illustrated embodiment) an independent pseudo-random sequence of digital values.*

4 Patent 5,710,834, "Real Time Encoder" embodiment, col. 17, line 41 – col. 25, line 25; Figs. 5-8.

sample of the input signal,[5] resulting in an output signal in which the encoding spans the entire signal.

Many of the other patents incorporated into the priority application 60/082,228 similarly teach arrangements in which the encoding spans the entire content.

Accordingly, applicants respectfully submit that claim 1 is fully supported by the priority application, pre-dating the Yamaguchi reference.

Likewise, the '834 patent (and others incorporated by reference in application 60/082,228) teaches the second feature alleged in the Final Action to be missing from 60/082,228, i.e., that the steganographic encoding has a strength that varies across the article in accordance with local characteristics thereof.

In the first embodiment of the '834 patent,[6] equation (2)[7] is a formula detailing how the amount of noise that might be added to a pixel without objectionable visual impairment is related to the square root of the pixel value. Equation (3) details how much the value of a pixel should be adjusted to effect encoding, using the determination of equation (2). A consequence of these formulas is that the amount of change applied to a pixel (i.e., the encoding strength) varies with the original pixel value. This disclosure thus provides the teaching alleged to be missing from application 60/082,228.

The second embodiment[8] of the '834 patent also provides this support. In this embodiment, the strength of the encoding is set by the First Scaler 208 (Fig. 2). This element sets a scale value for the added encoding signal, which scale value is a function of the input signal. In particular, the input signal is applied to a Lookup Table 204 and, based on the input signal value, the Lookup Table provides an output value by which the noise signal (i.e., the encoding signal) is scaled prior to adding to the input signal.

---

5 Patent 5,710,834, col. 18, lines – 63, e.g:

> *The input signal (which in the illustrated embodiment is an 8-20 bit data signal provided at a rate of one million samples per second, but which in other embodiments could be an analog signal if appropriate A/D and D/A conversion is provided) is applied from an input 218 to the address input 220 of the look-up table 204. For each input sample (i.e. look-up table address), the table provides a corresponding 8-bit digital output word. This output word is used as a scaling factor that is applied to one input of the first scaler 208...*

6 Patent 5,710,834, "BATCH ENCODING" embodiment, col. 6, line 24 – col. 17, line 40; Fig. 2.

7 Patent 5,710,834, col. 9, line 5.

8 Patent 5,710,834, "Real Time Encoder" embodiment, col. 17, line 41 – col. 25, line 25; Figs. 5-8.

Again, the incorporated-by-reference patent clearly teaches that the strength of the encoding signal varies with characteristics of the content being encoded:

> *Returning to the encoding apparatus, the look-up table 204 in the illustrated embodiment exploits the fact that high amplitude samples of the input data signal can tolerate (without objectionable degradation of the output signal) a higher level of encoded identification coding than can low amplitude input samples. Thus, for example, input data samples having decimal values of 0, 1 or 2 may be correspond (in the look-up table 204) to scale factors of unity (or even zero), whereas input data samples having values in excess of 200 may correspond to scale factors of 15. Generally speaking, the scale factors and the input sample values correspond by a square root relation.* ***That is, a four-fold increase in a value of the sampled input signal corresponds to approximately a two-fold increase in a value of the scaling factor associated therewith.***
>
> *(The parenthetical reference to zero as a scaling factor alludes to cases, e.g., in which the source signal is temporally or spatially devoid of information content. In an image, for example, a region characterized by several contiguous sample values of zero may correspond to a jet black region of the frame. A scaling value of zero may be appropriate here since there is essentially no image data to be pirated.)* [9]

In view of either of these two different embodiments, the '834 patent is believed to properly support the claimed limitation of "steganographic encoding having a strength that varies across the article in accordance with local characteristic thereof."

Additionally, the specification of the cited '834 patent was also filed as application 08,436,134, which issued as Rhoads' patent 5,748,763. The '763 patent was also among those incorporated-by-reference in the provisional priority application.[10] A claim of the '763 patent has language similar to the questioned limitation of pending claim 6. In particular, claim 1 of the '763 patent requires:

> *...wherein the relative* ***strength*** *of the identification code through different portions of the output image* ***changes both in accordance with characteristics of the input image****, and globally in accordance with a global scale factor.*[11]

Similar claim language is found in Rhoads' patent 6,400,827, which is a continuation of a division of application 08,436,134. The '134 patent is among those

---

9 Patent 5,710,834, col. 23, line 57 – col. 24, line 11.
10 Application 60/082,228, page 1, line 8.
11 Patent 5,748,763, col. 69, lines 20-24.

incorporated by reference into the provisional priority application.[12] This '827 patent includes the following claim:

> *4. The method of claim 1 that includes* ***changing the strength*** *of embedding* ***in accordance with a local attribute of the video data, rather than encoding at a constant strength across an entire video frame.***

Nearly the same phrase is also found in Rhoads patent 6,449,379, which is a division of a division of a continuation of incorporated-by-reference 08/436,134. That claim reads:

> *9. The method of claim 1 that includes* ***changing the strength*** *of encoding* ***in accordance with a local attribute of the video, rather than encoding at a constant strength across each video frame.***

Accordingly, in these three issued patents, the Office has already made implicit determinations that the cited specifications (incorporated-by-reference into the provisional priority application) have § 112 support for the questioned language.

(It should be noted that the embodiments noted above regarding specification support for the questioned limitations are exemplary only; several other bases for support of these limitations are found in the incorporated-by-reference documents.)

The "printed promotional material" language of claims 1 and 6 is supported *directly* by the provisional priority application 60/082,228. That application, for example, teaches applying the incorporated-by-reference watermarking techniques to a printed catalog:

> *The foregoing techniques are not limited to digital content files. The same approach is equally applicable with printed imagery, etc. A printed catalog, for example, can include a picture illustrating a jacket. Embedded in the picture is watermarked data. This data can be extracted by a simple hand-scanner/decoder device using straightforward scanning and decoding techniques (e.g. those known to artisans in those fields). In watermark-reading applications employing hand-scanners and the like, it is important that the watermark decoder be robust to rotation of the image, since the catalog photo will likely be scanned off-axis. One option is to encode subliminal graticules (e.g. visualization synchronization*

[12] Application 60/082,228, page 1, line 7.

codes) in the catalog photo so that the set of image data can be post-processed to restore it to proper alignment prior to decoding.

The scanner/decoder device can be coupled to a modem-equipped computer, a telephone, or any other communications device. In the former instance, the device provides URL data to the computer's web browser, linking the browser to the catalog vendor's order page.[13])

In view of the foregoing, withdrawal of the rejection of claims 1 and 6 over Yamaguchi is solicited.

Respectfully submitted,

DIGIMARC CORPORATION

Date: September 5, 2003

23735

Phone: 503-885-9699
FAX 503-885-9880

By____________________
William Y. Conwell
Registration No. 31,943

13 Application 60/082,228, page 5, line 29 – page 6, line 12.